Defining Intelligence

Psychologist Robert Sternberg defined intelligence as "the mental abilities necessary for adaptation to, as well as shaping and selection of, any environmental context (1997, p. 1)

Wechsler “the global and aggregate capacity of an individual to think rationally, act purposefully and to deal effectively with his/her environment.”

Intelligence has been defined in many ways: higher level abilities (such as abstract reasoning, mental representation, problem solving, and decision making), the ability to learn, emotional knowledge, creativity, and adaptation to meet the demands of the environment effectively.

The study of human intelligence dates back to the late 1800s when Sir Francis Galton (the cousin of Charles Darwin) became one of the first people to study intelligence.

- Galton operationalized intelligence as reaction time.
- Alfred Binet was the first psychologist who tried to formalise the concept of intelligence in terms of mental operations.
- The term "intelligence quotient," or IQ, was first coined in the early 20th century by a German psychologist named William Stern.

Theories of Intelligence

The psychometric approach considers intelligence as an aggregate of abilities. It expresses the individual’s performance in terms of a single index of cognitive abilities. On the other hand, **the information processing approach describes the processes people use in intellectual reasoning and problem solving.** The major focus of this approach is on how an intelligent person act. Rather than focusing on structure of intelligence or its underlying dimensions, information- processing approaches emphasise studying cognitive functions underlying intelligent behaviour.

SHOUT
SHARE
IT

Uni-factor or one factor theory

Binet conceptualised intelligence as consisting of one similar set of abilities which can be used for solving any or every problem in an individual's environment. His theory of intelligence is called Uni or one factor theory of intelligence.

Two Factor Theory

Charles Spearman (1927) proposed a two-factor theory of intelligence employing a statistical method called factor analysis. He showed that intelligence consisted of a general factor (g-factor) and some specific factors (s-factors).

The g-factor includes mental operations which are primary and common to all performances. In addition to the g-factor, he said that there are also many specific abilities. These are contained in what he called the s-factor. Excellent singers, architects, scientists, and athletes may be high on g-factor, but in addition to this, they have specific abilities which allow them to excel in their respective domains.

Theory of Primary Mental Abilities

Spearman's theory was followed by Louis Thurstone's theory. It states that intelligence consists of seven primary abilities, each of which is relatively independent of the others.

These primary abilities are:

i. Verbal Comprehension -grasping meaning of words, concepts, and ideas
ii. Numerical Abilities -speed and accuracy in numerical and computational skills
iii. Spatial Relations- visualising patterns and forms
iv. Perceptual Speed- speed in perceiving details
v. Word Fluency-using words fluently and flexibly
vi. Memory -accuracy in recalling information and
vii. Inductive Reasoning - deriving general rules from presented facts

Hierarchical Model

Arthur Jensen proposed a hierarchical model of intelligence consisting of abilities operating at two levels, called Level I and Level II.

Level I is the associative learning in which output is more or less similar to the input (e.g., rote learning and memory).

Level II called cognitive competence, involves higher-order skills as they transform the input to produce an effective output

Structure of Intellect Model

J.P. Guilford proposed the structure of-intellect model which classifies intellectual traits among three dimensions: operations, contents, and products.

Operations are what the respondent does. These include cognition, memory recording, memory retention, divergent production, convergent production, and evaluation.

Contents refer to the nature of materials or information on which intellectual operations are performed. These include visual, auditory, symbolic (e.g., letters, numbers), semantic (e.g., words) and behavioural (e.g., information about people's behaviour, attitudes, needs, etc.).

Products refer to the form in which information is processed by the respondent. Products are classified into units, classes, relations, systems, transformations, and implications.

Since this classification (Guilford, 1988) includes 6´5´6 categories, therefore, the model has 180 cells. Each cell is expected to have at least one factor or ability; some cells may have more than one factor. Each factor is described in terms of all three dimensions. The above-mentioned theories are representations of psychometric approach to understand intelligent behaviour.

Theory of Multiple Intelligences

Gardner proposed the theory of multiple intelligences. According to him, intelligence is not a single entity; rather distinct types of intelligences exist. Each of these intelligences are independent of each other. He described eight types of intelligence. These are as follows:

- **Linguistic intelligence**: Well-developed verbal skills and sensitivity to the sounds, meanings, and rhythms of words

- **Logical-mathematical intelligence**: The ability to think conceptually and abstractly, and the capacity to discern logically or numerical patterns

- **Visual-spatial intelligence**: The capacity to think in images and pictures, to visualize accurately and abstractly

- **Musical intelligence**: The ability to produce and appreciate rhythm, pitch, and timbre

- **Bodily-kinaesthetic intelligence**: The ability to control your body movements and to handle objects skilfully

- **Interpersonal intelligence**: The capacity to detect and respond appropriately to the moods, motivations, and desires of others

- **Intrapersonal intelligence**: The capacity to be self-aware and in tune with inner feelings, values, beliefs, and thinking processes

- **Naturalistic intelligence**: The ability to recognize and categorize animals, plants, and other objects in nature

Triarchic Theory of Intelligence

Robert Sternberg (1985) proposed the triarchic theory of intelligence. According to this theory, there are three basic types of intelligence: Componential, Experiential, and Contextual

Componential Intelligence: Componential or analytical intelligence is the analysis of information to solve problems. Persons high on this ability think analytically and critically and succeed in schools.

This intelligence has three components, each serving a different function. First is the **knowledge acquisition component**, which is responsible for learning and acquisition of the ways of doing things.

The second is the **meta or a higher order component**, which involves planning concerning what to do and how to do.

The third is the **performance component**, which involves actually doing things.

Experiential Intelligence: Experiential or creative intelligence is involved in using past experiences creatively to solve novel problems. It is reflected in creative performance. Persons high on this aspect integrate different experiences in an original way to make new discoveries and inventions. They quickly find out which information is crucial in a given situation.

Contextual Intelligence: Contextual or practical intelligence involves the ability to deal with environmental demands encountered on a daily basis. It may be called ‘street smartness’ or ‘business sense’

Sternberg’s triarchic theory of intelligence represents the **information processing approach** to understand intelligence.

Planning, Attention-arousal, and Simultaneous-successive (PASS) Model of Intelligence

This model has been developed by **J.P. Das, Jack Naglieri, and Kirby** (1994). According to this model, intellectual activity involves the interdependent functioning of three neurological systems, called the functional units of brain. These units are responsible for arousal/attention, coding or processing, and planning respectively.

Arousal and Attention

- State of arousal helps in attending to the stimuli.
- Arousal and attention enable a person to process information.
- Optimal level of arousal focuses our attention on relevant aspects of a problem. Too much or too little arousal interferes with attention and performance.

Example: Arousal helps the individual to focus one's attention on reading, learning and revising the contents of the material to be learnt.

Simultaneous-Successive Processing

Simultaneous processing helps you in grasping the meaning and relationship between the given abstract figures. Simultaneous processing takes place when you perceive the relations among various concepts and integrate them into a meaningful pattern for comprehension

Successive processing takes place when you remember all the information serially so that the recall of one lead to the recall of another. Learning of digits, alphabets, multiplication tables, etc. are examples of successive processing.

Planning

This is an essential feature of intelligence. After the information is attended to and processed, planning is activated. It allows us to think of the possible courses of action, implement them to reach a target, and evaluate their effectiveness. If a plan does not work, it is modified to suit the requirements of the task or situation

These PASS processes operate on a knowledge base developed either formally (by reading, writing, and experimenting) or informally

from the environment. These processes are interactive and dynamic in nature; yet each has its own distinctive functions

Fluid vs. Crystallized Intelligence

Raymond Cattell (1963) first proposed the concepts of fluid and crystallized intelligence and further developed the theory with John Horn.

Fluid intelligence is the ability to problem solve in novel situations without referencing prior knowledge, but rather through the use of logic and abstract thinking. Fluid intelligence can be applied to any novel problem because no specific prior knowledge is required (Cattell, 1963). As you grow older fluid increases and then starts to decrease in the late 20s

Crystallized intelligence refers to the use of previously-acquired knowledge, such as specific facts learned in school or specific motor skills or muscle memory (Cattell, 1963). As you grow older and accumulate knowledge, crystallized intelligence increases.

Telegram Link- https://t.me/ugcnetpsychologyforall